

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS

1-60. (Cancelled)

61. (Currently Amended) A rocking mechanism through which linear reciprocating movement of a piston of an internal combustion engine can be transferred, from the remote end of a con rod on which the piston is mounted, to a crankshaft;

wherein the rocking mechanism includes:

a rocking member;

mountings by which the rocking member is mountable, on a structure of or secured to a crankcase for the engine, for reversible rocking movement on a first axis;

a link member pivotally connected, at one of opposite ends thereof, to the rocking member so as to be pivotable relative to the rocking member on a second axis, offset from and parallel to the first axis, between two extreme positions; and

a holding means-device by which the link member is releasably holdable in either of the two extreme positions; and

wherein at its other end, the link member is adapted for pivotably connecting to the remote end of con rod so as to be pivotable relative to the con rod on a third axis which is offset from the second axis and parallel to the first and second axes and, at a location offset from the first axis, the rocking member is adapted for pivotally connecting to a little end of a further con rod, having a big end connectable to the crankshaft, for relative rotation between the rocking member and the further con rod on a fourth axis parallel to the first, second and third ~~fourth~~ axes.

62. (Previously Presented) The rocking mechanism of claim 61, wherein the rocking member has at least one plate member with the first and second axes extending normal to and through the at least one plate member.

63. (Previously Presented) The rocking mechanism of claim 61, wherein the rocking member has at least two mutually spaced, substantially parallel plate members with the first and second axes extending normal to and through each of the plate members.

64. (Previously Presented) The rocking mechanism of claim 61, wherein the mountings comprise a pair of axle members or trunnion pins each integral with and extending oppositely from the rocking member and each with an axis on the first axis.

65. (Previously Presented) The rocking mechanism of claim 61, wherein the mountings comprise openings defined by the rocking member or by fittings secured to the rocking member, by which the rocking member is adapted to receive an axle or a shaft or a respective axle or shaft extending from an adjacent structure of, or secured to, the engine crankcase.

66. (Previously Presented) The rocking mechanism of claim 61, wherein the mountings include an axle or shaft extending through the rocking member and adapted to extend through a further rocking member of a further adjacent rocking mechanism.

67. (Previously Presented) The rocking mechanism of claim 61, wherein the link member is of elongate form and adapted for pivotable coupling at each end, and wherein the link member comprises a single elongate bar or a parallel pair of laterally spaced elongate bars.

68. (Previously Presented) The rocking mechanism of claim 67, wherein the link member is forked in comprising a parallel pair of elongate arms, joined at an end of each arm at which the link member is connectable to the rocking member at the second axis, and wherein the arms are joined at said end of each by a cylindrical web or boss by which the link member is able to be

connected to the rocking member by a pin extending through each of the web or boss and the rocking member.

69. (Currently Amended) The rocking mechanism of claim 61, wherein the holding ~~means is a device~~ is operable to hold the link member at a selected one of two extreme positions between which the link member is pivotable relative to the rocking member.

70. (Currently Amended) The rocking mechanism of claim 61, wherein the holding ~~means is a~~ device is operable to hold the link member at any required position at one of or intermediate two extreme positions between which the link member is pivotable relative to the rocking member.

71. (Currently Amended) The rocking mechanism of claim 61, wherein the holding ~~means is a device~~ is operable by a mechanical and/or a hydraulic ~~means~~ device.

72. (Currently Amended) The rocking mechanism of claim 61, wherein the mountings comprise an opening defined by the rocking member or by a fitting secured to the rocking member; and wherein the holding ~~means device~~ includes an adjusting shaft or axle having an axis co-incident with the first axis on which it is rotatable relative to the rocking member, an eccentric rotatable with the adjusting shaft or axle to orbit around the first axis and a holding arm which is journaled at one end on the eccentric and extends therefrom radially with respect to the first axis to a pivotable coupling between its other end and the link member, whereby the holding arm is moved with orbiting of the eccentric in response to rotation of the adjusting shaft or axle to pivot the link member on the second axis relative to the rocking member.

73. (Previously Presented) The rocking mechanism of claim 72, wherein the adjusting shaft or axle forms part of an hydraulic actuator which includes a housing into which the adjusting shaft or axle extends, the actuator further including a vane which extends radially from the adjusting shaft or axle within a chamber defined by the housing, with the housing adapted for

the supply of hydraulic fluid to the chamber for causing the vane to sweep arcuately in the chamber and thereby rotate the adjusting shaft.

74. (Currently Amended) The rocking mechanism of claim 61, wherein the link member is pivotable relative to the rocking member on said second axis by ~~means of~~ a pin which is journaled in the rocking member and to which the one end of the link member is non-rotatably engaged or secured; the pin forms part of a hydraulic actuator which comprises the holding ~~means~~ device, the actuator further including a vane which extends radially from the pin within a chamber defined by or on the rocking member in which the vane is able to sweep arcuately with rotation of the pin, and ~~means a mechanism~~ by which hydraulic fluid is able to be supplied to the chamber for moving the vane to and holding the vane in one of two extreme positions.

75. (Previously Presented) The rocking mechanism of claim 72, wherein the housing is adapted for the supply of hydraulic fluid to a selected one of two regions of the chamber for causing the vane to sweep and thereby rotate the adjusting shaft in a required direction, and wherein the hydraulic fluid is able to be supplied to move the vane to and hold the vane in only one of the two extreme positions, against the bias of a spring acting to move the vane to and hold the vane in the other extreme position as hydraulic fluid is released from the chamber.

76. (Previously Presented) The rocking mechanism of claim 61, wherein the spacing between the first and second axes is the same as the spacing between the second and third axes, and the link member is pivotable on the second axis to a position in which the first and third axes are co-incident.

77. (Previously Presented) The rocking mechanism of claim 61, wherein the rocking member is adapted for pivotally connecting to the little end of the further con rod on the fourth axis at a location at which the second and fourth axes are co-incident.

78. (Currently Amended) An internal combustion (IC) engine having a cylinder head and a crankcase, a plurality of cylinders defined by the cylinder head, a crankshaft journaled in the crankcase for rotation on a longitudinal axis of rotation, a respective piston in each cylinder, and a respective con rod on one end of which each piston is mounted and from the remote end of which each piston is connected to the crankshaft for transferring linear reciprocation movement of each piston in its cylinder to, and for rotating, the crankshaft; the engine further includes, for at least one cylinder, a rocking mechanism through which the con rod (hereinafter referred to as the "first con rod"), on which the piston of the one cylinder is mounted, is connected to the crankshaft; wherein the rocking mechanism includes:

a rocking member;

mountings by which the rocking member is mounted, on a structure of or secured to a crankcase for the engine, for reversible rocking movement on a first axis parallel to the crankshaft axis;

a link member pivotally connected, at one of opposite ends thereof, to the rocking member so as to be pivotable relative to the rocking member on a second axis, offset from and parallel to the first axis, between two extreme positions; and

a holding means-device by which the link member is releasably holdable in either of the two extreme positions;

wherein the other end of the link member is pivotally connected to the remote end of the first con rod so as to be pivotable relative to the first con rod on a third axis offset from and parallel to the first and second axes; the rocking member is pivotally connected to a little end of a second con rod having a big end journaled on the crankshaft, for relative rotation between the rocking member and the second con rod on a fourth axis parallel to the first, second and third axes; the first and second con rods are movable in the same plane or parallel planes and the first, second, third and fourth axes are parallel to the axis of rotation of the crankshaft; and wherein the arrangement is such that, with the holding means-device holding the link member, linear reciprocating motion of the piston of the one cylinder is able to be transferred to the crankshaft and rotate the crankshaft, by the resultant motion of the first con rod being transferred to the second con rod by rocking motion of the rocking member on the first axis, by pivoting of the

link member relative to the first con rod on the third axis, and by pivoting of the rocking member relative to the second con rod on the fourth axis.

79. (Currently Amended) The rocking mechanism of claim 61, wherein the mountings comprise an opening defined by the rocking member or by a fitting secured to the rocking member; and wherein the holding ~~means~~ device includes an adjusting shaft or axle having an axis co-incident with the first axis on which it is rotatable relative to the rocking member, an eccentric rotatable with the adjusting shaft or axle to orbit around the first axis and a holding arm which is journaled at one end on the eccentric and extends therefrom radially with respect to the first axis to a pivotable coupling between its other end and a lug extending from the remote end of the first con rod offset and parallel to the third axis.

80. (Currently Amended) The 1C engine of ~~claim 18~~ claim 78, wherein the mountings comprise an opening defined by the rocking member or by a fitting secured to the rocking member; and wherein the holding ~~means~~ device includes an adjusting shaft or axle having an axis co-incident with the first axis on which it is rotatable relative to the rocking member, an eccentric rotatable with the adjusting shaft or axle to orbit around the first axis and a holding arm which is journaled at one end on the eccentric and extends therefrom radially with respect to the first axis to a pivotable coupling between its other end and the link member, whereby the holding arm is moved with orbiting of the eccentric in response to rotation of the adjusting shaft or axle to pivot the link member on the second axis relative to the rocking member.

81. (Currently Amended) An internal combustion (1C) engine having a cylinder head and a crankcase, a plurality of cylinders defined by the cylinder head in an in-line configuration, a crankshaft journaled in the crankcase for rotation on a longitudinal axis of rotation, a respective piston in each cylinder, and a respective con rod on one end of which each piston is mounted and from the remote end of which each piston is connected to the crankshaft for transferring linear reciprocation movement of each piston in its cylinder to, and for rotating, the crankshaft; the engine further includes, for each of at least two cylinders, a respective rocking mechanism

through which the con rod (hereinafter referred to as the "first con rod"), on which the piston of each of the at least two cylinders is mounted, is connected to the crankshaft; wherein the rocking mechanism includes:

a rocking member;

mountings by which the rocking member is mounted, on a structure of or secured to a crankcase for the engine, for reversible rocking movement on a first axis parallel to the crankshaft axis;

a link member pivotally connected, at one of opposite ends thereof, to the rocking member so as to be pivotable relative to the rocking member on a second axis, offset from and parallel to the first axis, between two extreme positions; and

a holding means-device by which the link member is releasably holdable in either of the two extreme positions;

wherein the other end of the link member is pivotally connected to the remote end of the first con rod so as to be pivotable relative to the first con rod on a third axis offset from and parallel to the first and second axes; the rocking member is pivotally connected to a little end of a second con rod having a big end journalled on the crankshaft, for relative rotation between the rocking member and the second con rod on a fourth axis parallel to the first, second and third axes; the first and second con rods are movable in the same plane or parallel planes and the first, second, third and fourth axes are parallel to the axis of rotation of the crankshaft; and wherein the arrangement is such that, with the holding ~~means-device~~ holding the link member, linear reciprocating motion of the piston of the one cylinder is able to be transferred to the crankshaft and rotate the crankshaft, by the resultant motion of the first con rod being transferred to the second con rod by rocking motion of the rocking member on the first axis, by pivoting of the link member relative to the first con rod on the third axis, and by pivoting of the rocking member relative to the second con rod on the fourth axis; and wherein the holding ~~means-device~~ for each of the at least two cylinders is operable to pivot the link member to bring its fourth axis into coincidence with the first axis and thereby enable its piston to be de-activated.

82. (Currently Amended) An internal combustion (1C) engine having a cylinder head and a crankcase, a plurality of cylinders defined by the cylinder head in an in-line configuration, a crankshaft journaled in the crankcase for rotation on a longitudinal axis of rotation, a respective piston in each cylinder, and a respective con rod on one end of which each piston is mounted and from the remote end of which each piston is connected to the crankshaft for transferring linear reciprocation movement of each piston in its cylinder to, and for rotating, the crankshaft; the engine further includes, for each cylinder, a respective rocking mechanism through which the con rod (hereinafter referred to as the "first con rod"), on which the piston of each cylinder is mounted, is connected to the crankshaft: wherein each rocking mechanism includes:

a rocking member;

mountings by which the rocking member is mounted, on a structure of or secured to a crankcase for the engine, for reversible rocking movement on a first axis parallel to the crankshaft axis;

a link member pivotally connected, at one of opposite ends thereof, to the rocking member so as to be pivotable relative to the rocking member on a second axis, offset from and parallel to the first axis, between two extreme positions; and

a holding ~~means~~ device by which the link member is releasably holdable in either of the two extreme positions;

wherein the other end of the link member is pivotally connected to the remote end of the first con rod so as to be pivotable relative to the first con rod on a third axis offset from and parallel to the first and second axes; the rocking member is pivotally connected to a little end of a second con rod having a big end journaled on the crankshaft, for relative rotation between the rocking member and the second con rod on a fourth axis parallel to the first, second and third axes; the first and second con rods are movable in the same plane or parallel planes and the first, second, third and fourth axes are parallel to the axis of rotation of the crankshaft; and wherein the arrangement is such that, with the holding ~~means~~ device holding the link member, linear reciprocating motion of the piston of the one cylinder is able to be transferred to the crankshaft and rotate the crankshaft, by the resultant motion of the first con rod being transferred to the

second con rod by rocking motion of the rocking member on the first axis, by pivoting of the link member relative to the first con rod on the third axis, and by pivoting of the rocking member relative to the second con rod on the fourth axis; and wherein the holding ~~means~~ device for each rocking mechanism is operable in unison with each other holding ~~means~~ device to vary the stroke of each piston between two extreme settings.

83. (Currently Amended) An internal combustion (IC) engine having a cylinder head and a crankcase, a plurality of cylinders defined by the crankcase cylinder head in an in-line configuration, a crankshaft journaled in the crankcase for rotation on a longitudinal axis of rotation, a respective piston in each cylinder, and a respective con rod on one end of which each piston is mounted and from the remote end of which each piston is connected to the crankshaft for transferring linear reciprocation movement of each piston in its cylinder to, and for rotating, the crankshaft; the engine further includes, for each cylinder, a respective rocking mechanism through which the con rod (hereinafter referred to as the "first con rod"), on which the piston of each cylinder is mounted, is connected to the crankshaft; wherein each rocking mechanism includes:

a rocking member;

mountings by which the rocking member is mounted, on a structure of or secured to a crankcase for the engine, for reversible rocking movement on a first axis parallel to the crankshaft axis;

a link member pivotally connected, at one of opposite ends thereof, to the rocking member so as to be pivotable relative to the rocking member on a second axis, offset from and parallel to the first axis, between two extreme positions; and

a holding ~~means~~ device by which the link member is releasably holdable in either of the two extreme positions;

wherein the other end of the link member is pivotally connected to the remote end of the first con rod so as to be pivotable relative to the first con rod on a third axis offset from and parallel to the first and second axes; the rocking member is pivotally connected to a little end of a second con rod having a big end journaled on the crankshaft, for relative rotation between the rocking

member and the second con rod on a fourth axis parallel to the first, second and third axes; the first and second con rods are movable in the same plane or parallel planes and the first, second, third and fourth axes are parallel to the axis of rotation of the crankshaft; and wherein the arrangement is such that, with the holding ~~means-device~~ holding the link member, linear reciprocating motion of the piston of the one cylinder is able to be transferred to the crankshaft and rotate the crankshaft, by the resultant motion of the first con rod being transferred to the second con rod by rocking motion of the rocking member on the first axis, by pivoting of the link member relative to the first con rod on the third axis, and by pivoting of the rocking member relative to the second con rod on the fourth axis; wherein the mountings comprise an opening defined by the rocking member or by a fitting secured to the rocking member; and wherein the holding device includes an adjusting shaft or axle having an axis co-incident with the first axis on which it is rotatable relative to the rocking member, an eccentric rotatable with the adjusting shaft or axle to orbit around the first axis and a holding arm which is journalled at one end on the eccentric and extends therefrom radially with respect to the first axis to a pivotable coupling between its other end and the link member, whereby the holding arm is moved with orbiting of the eccentric in response to rotation of the adjusting shaft or axle to pivot the link member on the second axis relative to the rocking member; and wherein the engine includes ~~means-device~~ drivingly connecting the adjusting shaft and the crankshaft to provide a fixed rotational ratio of one to two respectively, whereby said engine is operable with an Atkinson Cycle motion.

84. (Currently Amended) The engine of any one of ~~claims 21 to 23~~ claims 81 to 83, wherein the plurality of cylinders are in-line in a first bank of a V-type configuration, with the engine including a further plurality of cylinders in-line in a second bank.